SHUBHRA BAJPAI

CORRESPONDENCE

Shubhra Bajpai, Senior Scientist

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RESEARCH INTEREST

Thermal spraying, Hard Coatings for Tribological Application, Oxide dispersion strengthened alloys (ODS Steel), Plasma facing wall components, Structural and Nano-mechanical characterization of materials by nanoindentation, AFM, FE-SEM, Micro-CT, etc.

Modelling and predictive analysis using packages: Image processing- AviZo, ImageJ; Computational fluid dynamics (CFD)- Ansys fluid; Programming- MatLab, C++, Robot prg lang.; KRL; Finite element analysis (FEM)- Ansys mechanical, OOF2, Strand7 etc.

EDUCATION

- 2012, ***M.Tech.***, Materials Resource Engineering, Academy of Scientific & Innovative Research (AcSIR), India (CGPA 8.48/ 10)
- 2010, ***B.Tech.***, Material Sciences & Metallurgical Engineering, University Institute of Engineering & Technology (UIET), Chhatrapati Shahu Ji Maharaj University (CSJMU), Kanpur India (CGPA 9.22/ 10). CGPA 10 out of 10 in 5^{th} and 6^{th} semester.

PROFESSIONAL EXPERIENCE

- December 2016 Onwards:
  Senior Scientist, CSIR- Institute of Minerals & Materials Technology, Bhubaneswar, India

- December 2012 Onwards:
  Scientist, CSIR- Institute of Minerals & Materials Technology, Bhubaneswar, India
- August 2010- December 2012:
  Scientist Trainee, CSIR- Institute of Minerals & Materials Technology, Bhubaneswar, India

RESEARCH PROJECTS

1. Rare earth phosphate TBCs for high-temperature insulation and hot corrosion protection applications, Funding agency: CSIR Focused basic research (FBR-Aerospace theme) Project, India, Role: Project Investigator, Duration: 2 yr, Status: Provisionally approved
2. Development of advanced Tribological Coatings and Environmental Barrier Coatings (EBC) by Electrophoretic deposition and thermal spraying for mining equipments, pipeline, industrial applications and processes, Funding agency: CSIR Fast Track Translational (FTT) Project, India, Role: Area leader and Co-Project Investigator, Duration:2 yr, Duration: Nov 2018-March 2020, Status: Completed
3. Synthesis and Characterization of ODS steels using alternative dispersoid, BRNS funded, Role: Project Investigator (PI), Duration: Feb 2017-20, 3yrs, Status: Completed
4. Development of (W/W-Y-Cr) based double layer coating structures for plasma facing components, BRNS funded, Role:Project Investigator (PI), Duration: Aug 2016-March 2019, 2.5yrs, Status:Completed
5. Preparation of fine Fe-P powder for coating application, ID:SSP-324, Role:Co-Project Investigator (Co-PI), TATA Steel limited, Duration: Sept 2017-March 19, 1.5yrs, Status:Completed
6. Preparation of Titanium Carbide powder from red mud , ID: SSP-313, Duration: Jan 2017-April18, Role: Team member, Vedanta Limited, India, Status: Completed
7. Centre for special materials, ID: ESC401, Work package: Development of thermal barrier coatings (RPIIWPI), Duration: 2013-17, 5yrs, Role: Work package leader, CSIR Funded, Status: Completed
8. Development of Tungsten Alloy Cube and its characterization, ID: GAP-282, Duration: Aug 2015-Jan 17, 1.5 yrs, Role: Team member, Defence Research and Development Organization (DRDO), India, Status: Completed
9. Robotics and micro machines, Duration: 2013-17, 5yrs, Role: Team member, CSIR Funded, Status: Completed
10. Design & development of low cost housing for rural areas, ID:RSP 4020, Duration: 2015-16, 1yr, Role: Team member, CSIR Funded, Status: Completed

11. Movable plasma incinerator for biomedical waste treatment, ID: RSP 4020, (P14), Duration:2016-17, 1yr, CSIR Funded, Role: Team member
12. Development of 3D diamond like carbon (DLC) coating for wear resistant parts in an indigenously developed plasma reactor, ID:OLP 64, Duration: 2015-17, 2 yrs, Status: Completed, CSIR Funded, Role: Team member

PUBLICATIONS

[1] T. Dash, Tapan K. Rout, B. B. Palei, S. Bajpai, S. Kundu, A. N. Bhagat, B. K. Satpathy, S. K. Biswal, A. Rajput, A. K. Sahu and S. K. Biswal, "Synthesis of α-Al2O3-Graphene Composite: A Novel Product is to Provide Multi-Functionalities on Steel Strip Surface", SN Applied Sciences, 2020 (Accepted).

[2] Ayashkant Mekap, Rakesh K. Sahoo, Arya Das, Debidutta Debasish, Shubhra Bajpai, Saroj Kumar Singh,"Two-step plasma mediated synthesis of mullite and sillimanite powder and their suspensive spray coating on stainless steel",Surface and Coatings Technology,Vol 372, pg: 103-110, 2019.

DOI: https://doi.org/10.1016/j.surfcoat.2019.05.027

[3] Gaurav Bajpai, Mayank Ostawal, Igamcha Moirangthem, Shubhra Bajpai, Dharma R.Basaula, Mahmud Khan, Shun-Wei Liu, Sajal Biring, Somaditya Sen, "Multicomponent Zn(1-*x*)Fe0.8*x*Na0.2*x*O semiconductors: Effect of dopant concentration and ionic radius on structural, opto-electronics, magnetic and sensing properties", Materials Science in Semiconductor Processing, Vol 98, pg: 121-130, 2019.

DOI: https://doi.org/10.1016/j.mssp.2019.04.003

[4] G. Bajpai, S. Riyajuddin, K. Ghosh, S. Bajpai, D.R. Basaula, S. Bhatt, M. Khan, S. W. Liu, S. Biring, S. Sen, "Structural, opto-electronics and magnetic study of Fe/Si doped ZnO". *J Mater Science: Materials in Electronics, Vol* 30, pg: 9344–9355, 2019.

DOI: https://doi.org/10.1007/s10854-019-01264-6

[5] B Swain, S Bajpai, A Behera, "Microstructural evolution of NITINOL and their species formed by atmospheric plasma spraying", Surface Topography: Metrology and Properties, vol 7, pg: 15006, 2018,

DOI:https://doi.org/10.1088/2051-672X/aaf30e

[6] Gaurav Bajpai, Igamcha Moirangthem, Shuvam Sarkar, Sudipta Roy Barman, C.P. Vinod, Shubhra Bajpai, Sk. Riyajuddin, Kaushik Ghosh, Dharma R. Basaula, Mahmud Khan, Shun-Wei Liu, Sajal Biring, Somaditya Sen, "Role of Li+ and Fe3+ in modified ZnO: structural, vibrational, opto-electronic mechanical and magnetic properties", Ceramics International , vol 45, 2019, pg: 7232-43

DOI:10.1016/j.ceramint.2019.01.004

[7] Tarini S Acharya, mayadhar debata, Pradyut Sengupta, Prajna P Acharya, Shubhra Bajpai, K Jayasankar; 'Effect of High Energy Ball Milling on Structure and Properties of 95W-3.5Ni-1.5Fe Heavy Alloys'; International Journal of Refractory Metals and Hard Materials. August 2017, Vol. 69, pp 170-179,

DOI: https://doi.org/10.1016/j.ijrmhm.2017.08.007

[8] S. Jena, S. K. Acharya, H. C. Das, P.P. Patnaik, *S. Bajpai*, 'Investigation of the effect of FeCl3 on combustion and emission of diesel engine with thermal barrier coating'; Sustainable Environment Research. Oct., 2018, Vol. 28 , pg 72-78

DOI: https://doi.org/10.1016/j.serj.2017.10.002

[9] Rakesh Sahoo, Sanghamitra Dash, Arya Das, Shubhra Bajpai, Debidutta Debasish.; Saroj K Singh, 'Synthesis of MgAl2O4 spinel by thermal plasma and its synergetic structural study', Journal of Alloys and Compounds, Aug., 2017, Vol. 726 , pg 1186-1194

DOI: https://doi.org/10.1016/j.jallcom.2017.08.085

[10] James Mathew, Animesh Mandal, Deepak Kumar Sahani, Shubhra Bajpai, M Chakraborty,Geoff West, Prakash Srirangam, "Effect of semi-solid forging on microstructure and mechanical properties of in-situ cast Al-Cu-TiB2 composites", Journal of Alloys and Compounds, Vol. 712, July 2017, pg 460-467

DOI: http://doi.org/10.1016/j.jallcom.2017.04.113

[11] Somaditya Sen, Gaurav Bajpai, Tulika Srivastava, Mohd. Nasir, Saurabh Tiwari, Shubhra Bajpai, E.G. Rini, Sajal Biring, "A Comprehensive Theoretical and Experimental study on Structural and Mechanical Properties of Si doped ZnO",Scripta Materialia, Vol. 135, 2017, pg 1–4

DOI: http://dx.doi.org/10.1016/j.scriptamat.2017.03.022

[12] Aminul Islam, Shahid Anwar, Shubhra Bajpai, Sharmistha Anwar, "Structural and Mechanical studies of W2N embedded Si3N4 nanocomposite hard coating prepared by Reactive Magnetron Sputtering", Surface & coating technology, Vol 311, 2017, pg 268–273

DOI: http://dx.doi.org/10.1016/j.surfcoat.2016.12.119

[13] Pritam Das, Shahid Anwar, Shubhra Bajpai, Sharmistha Anwar, "Structural and mechanical evolution of TiAlSiN nanocomposite coating under influence of Si3N4 power", Surface & coating technology,Vol. 307 (A) (2016), pg 676-682.

DOI: http://dx.doi.org/10.1016/j.surfcoat.2016.09.065

[14] Sunil Kumar Pradhan, Ranjan Barik, Sivaiah Bathula, Ajay Dhar, Jayasankar Kalidoss, Shubhra Bajpai, "Development of High Density Tungsten based Scandate by Spark Plasma Sintering for the Application in microwave tube Devices", International Journal of Refractory Metals and Hard Materials, September 2016.Vol 61, pg 215-224

DOI: http://dx.doi.org/10.1016/j.ijrmhm.2016.09.002

[15] S. Bajpai, A. Gupta, S.K. Pradhan, T. Mandal, Kantesh Balani, "Crack Propagation Resistance of Pulsed Laser Deposited Alumina-Hydroxyapatite Coating". *Journal of Minerals, Metals, and Materials (JOM)*, Vol. 66 (10) (2014), pg 2095-2107

DOI: 10.1007/s11837-014-1152-3

CONFERENCE PROCEEDINGS

1. 'Surface Engineering and Coating Activities at CSIR-IMMT Bhubaneswar: An overview' L. Besra, S. Bajpai, S. Mantry and Sriparna Chatterjee, National Conference on Coating Technology (NCiC:2019), CSIR-IMMT, Bhubaneswar, 24-25 January, 2019
2. 'A Novel Fe-P/ Reduced Graphene Oxide Coating using Thermal Plasma Spray with excellent Mechanical properties', Snigdha Gochhayat, Debidutta Debasish, Shubhra

Bajpai, Tapan K Rout, National Conference on Coating Technology (NCiC:2019), CSIR-IMMT, Bhubaneswar, 24-25 January, 2019

3. 'Synthesis and consolidation of oxide dispersion strengthened (ODS) ferritic alloy' Shubhra Bajpai, K. Jayasankar, and Arup Dasgupta, 2nd INAE-NAEK workshop on "High Temperature Materials' during 14-15 May 2018 at Changwon, Korea
4. 'Structural studies of Y-Ti-O complex oxide synthesized by mechanical milling' Arya Das, Shubhra Bajpai, Pradyut Sengupta, Pradyumna Kumar Parida, Mayadhar Debata and Arup Dasgupta, International Conference on Electron Microscopy and Allied Techniques-2018, Bhubaneswar, 18-20 July 2018
5. 'Microstructural characterization of Plasma sprayed LaPO4 based coating', Shubhra Bajpai, G. Sumanth, Ayashkant Mekap and D. Debasish, International Conference on Surface Engineering (INCOSURF-2018),IISc Bangalore, 9-11 August, 2018
6. 'Activated sintering of self-passivating W alloy and its characterization', A.R. Pati, M. Debata, S. Bajpai, P. A. Rayajada, S. K. Singh, National Metallurgists' Day (NMD) ATM 2017 during 11-14 November 2017 at BITS Pilani, Goa.
7. 'Plasma spray coating of mechanically alloyed iron aluminide', P. Sengupta, A.. Panigrahi, S. Bajpai, B. Bhoi, M. Debata, National Metallurgists' Day (NMD) ATM 2017 during 11-14 November 2017 at BITS Pilani, Goa.
8. 'Spark Plasma sintering of ODS steel and its characterization', S. Bajpai, A. Pandey, M. Debata and K. Jayashankar, International Conference on Electron Microscopy and Allied Techniques-2017, Mahabalipuram, 17-19 July 2017.
9. 'Study of nickel interlayer thickness effect on WN/Ni multilayer thin film', PL Moharana, S Anwar, A Islam, S Bajpai, S Anwar, AIP Conference Proceedings Vol. 1832 (1), 080023, 2017 (61st DAE Solid State Physics Symposium, KIIT University, Bhubaneswar, Odisha during Dec 26-30, 2016) DOI: https://doi.org/10.1063/1.4980483
10. 'Structural and mechanical properties analysis of sputtered W2N/Ni multilayered thin films', Pravati Nayak, Sharmistha Anwar, Shubhra Bajpai, and Shahid Anwar, AIP Conf. Proc. Vol. 1832, 080063, 2017 (61st DAE Solid State Physics Symposium, KIIT University, Bhubaneswar, Odisha during Dec 26-30, 2016). DOI: http://dx.doi.org/10.1063/1.4980523
11. 'Environmental issues in Materials Processing', D. Debasish, S.Bajpai and S.K. Singh, National Symposium on Industrial Safety and Environment Management (ISEM – 2016) at Bhubaneswar, India during 16-18 March, 2016, PP-136-141, ISBN: 978-93-80475-09-7
12. 'Nanomechanical characterization and micro tomography of tungsten based alloys', Shubhra Bajpai, M Debata, T S Acharya and B K Mishra; International conference on Powder Metallurgy (PM-16) during 17-20 Feb, 2016
13. 'Sintering Behaviour of Tungsten Heavy Alloy Prepared From Powders Milled in a Dual Drive Planetary Ball Mill', Mayadhar Debata, P P Acharya, T Sankar Acharya, S Bajpai, J Kalidoss and B K Mishra; International conference on Powder Metallurgy (PM-16) during 17-20 Feb, 2016
14. 'Indentation-creep study of multilayer hydrogenated DLC:N /DLC coating deposited by RF-PCVD method', S.K. Pradhan, Shubhra Bajpai, Sambita Sahoo and B.K.Mishra; PFAM-21 at IIT Guwahati during 10-13 Dec 2012

15. 'CVD diamond based windows: microstructure and optical properties', Sushmita Dey, Sambita Sahoo, Shubhra Bajpai, S.K Pradhan; PFAM-21 at IIT Guwahati during 10-13 Dec 2012.
16. 'Mechanical properties of single and multilayer CrN films synthesized by pulsed DC sputtering' , M. Jeevitha, Shubhra Bajpai and S. K. Pradhan,," American Institute of Physics Conf. Proc. 1451, pp. 263-265, 2012 DOI:http://dx.doi.org/10.1063/1.4732435

INTERNATIONAL/ NATIONAL TECHNICAL TALKS/ CONFERENCE/ WORKSHOP/ TRAINING

1. Mentored a total of 12 winter and summer intern students. 01 M.Tech student.
2. Invited talk on the topic 'AFM and Nanoindentation' as guest speaker in a one week Course 'New trends in Process Metallurgy, Material Processing and Characterization' held during 19 th to 23 rd March, 2018 at Veer Surendra Sai University of Technology, Burla, Sambalpur
3. Organising member and Participant in one day workshop on "Plasma Processing of Minerals and Materials" on 21 October, 2016 at CSIR-IMMT, Bhubaneswar
4. Organising member of workshop cum exhibition- Popularizing Rural Technology in Indian Scenario (PopularTech-2016) during 13-14 April 2016 at CSIR-IMMT, Bhubaneswar
5. Co-convener and Participant 2 day workshop on Advanced Coating Technology (WACT-16) during 25-26 Feb 2016 at CSIR-IMMT, Bhubaneswar
6. Participated in National Symposium on Industrial Safety and Environment Management (ISEM – 2016) during 16-18 March, Bhubaneswar, 2016
7. Participated in the workshop "Design and Analysis of Experiments (DOEWS-2015)" organized by ISI, Kolkata.
8. Participant in 10 days 'Induction programme for newly recruited scientist' at CSIR-HRDC, Ghaziabad during 20-29 July, 2015
9. Treasurer and Participant in International workshop on Odisha's Gemstones organized at CSIR-IMMT, Bhubaneswar (Feb. 23, 2015, 1 day)
10. Participant in 6th Asian Thermal Spray Conference (ATSC-2014) at Hyderabad (Nov. 24-26, 2014, 3 day)
11. Oraginising member and Participant in International Conference on Emerging Materials and Processes-2014 (ICEMP) organized at CSIR-IMMT, Bhubaneswar (Feb. 26- 28, 2014, 3 days)
12. Participated in national seminar on Traditional Knowledge and Practices for Sustainable Development held at CSIR-IMMT, Bhubaneswar (15th April, 2013)
13. Participated in international seminar on Mineral Processing Technology held at CSIR-IMMT, Bhubaneswar (MPT-2013)(10th to 13th December, 2013)
14. Participated in DST SERB School on "Tokamaks and Magnetised Plasma Fusion" organized at IPR, Gandhinagar (Feb. 25-Mar. 15, 2013, 20 days)
15. Attended Processing and Fabrication of Advanced Materials (PFAM-21)at IIT Guwahati, India (10-13, December 2012, 4 days)

16. Attended Symposium on Thin films: Science and Technology organized by Indian Vacuum Society (IVS) at BARC, Mumbai, India (9–12 November 2011, 4 days)

LIFE MEMBER:

1. Electron Microscope Society of India (EMSI)- [LM-1349]
2. Powder metallurgy association of India (PMAI)- [LM 84915]
3. Indian Institute of Minerals Engineering (IIME) [LM-1103]
4. Indian Institute of Metals (IIM) [LM- 56654]